Solar Eye User Manual

Edition <1.0>

Table of Contents

1. Introductions……3
1.1 Packing List……4
1.2 Safety and Notes……5
2. Product Installation……6
2.1 Connection Solar Bee and Straight Networking Cable……6
2.2 Solar Bee Hanging Installation……7
2.3 SD Card in Solar Eye and Battery Installation Steps……8
2.4 Solar Eye Installation……10
2.4.1 Detachable Chassis Fixation……10
2.4.2 Wall Mounting……11
3. Interface Introduction……12
3.1 Main Interface……12
3.2 Sub Interface……13
4. Set & Operation……14
4.1 Initial Setting……14
4.1.1 Set Time……14
4.1.2 Set Currency……15
4.1.3 Set Yield Coefficient……15
4.1.4 Set Emission Coefficient……16
4.2 Wireless Connection……16
4.2.1 Connection Type……17
4.2.2 Set Up Wireless Connection……17
4.3 Alarm Warning Setting……18
4.4 Data Storage Interval Time Setting……19
4.5 Restore Factory Default Settings……19
4.6 History Energy and Power Value Yield View……19
5. Reference……21
6. Error Message……22
7. Contact……24

1. Introductions

Solar Eye is desktop monitoring device, developed for home and small commercial PV solar system. This device is able to monitor up to 5 inverters simultaneously, transfer data through wireless network and display relevant data on the LCD.

Features:

- Integrated Large LCD display
- Multiple display - Graph or bar chart display options
- Wireless Technology (Up to 150 meter in open area and up to 100 meter in building)
- Retro fit on any EverSolar inverter, monitor up to 5 inverters
- Micro SD card storage for history monitoring data
- Real time monitoring of Power Generation, Export value and Carbon Saving

1.1 Packing List

The packing list of Solar Eye as below:

A

B

C

D

E

F

G

H

I

Table 1-1 Packaging List (1)

Location	Quantity	Name	Purpose
A	1	Solar Eye	Display terminal of inverter data
B	1	Solar Bee	Collect inverter data
C	1	Waterproof Seal Sets	Secure water and dust protection of Solar Bee (IP65)
D	1	Operating& Installation Instruction	Product operating & installation instruction
E	4	wall plug	For Solar Bee wall mounting
F	2	Screw ST2.7×6	Fix the suspension loop to Solar Bee
G	2	Solar Bee Suspension Loop	For Solar Bee wall mounting
H	1	The base of Solar Eye	For Solar Eye installation on the table
I	4	Screw ST3×25	For Solar Bee & Solar Eye wall mounting

1.2 Safety and Notes

1）Read the instructions before installation

2）Disconnect inverter power before installing Solar Bee

3）If the product is damaged, please contact your local maintenance center or return to the dealers/distributors for repair

4）Please do NOT try to open the Solar Eye and Solar Bee, or force it in anyway as it will VOID your warranty and we will not be able to exchange it

5）Please do not put Solar Eye in the water or any other liquids.

6）Please do not place Solar Eye near heat or flame, or any place with high humidity or low temperature

7）Please handle the product carefully

9）Please keep the product away from children

10）Please use the product under the environment with temperature

ranging from -20℃ to 50 ℃, and relative humidity ≤ 80%

11）When Solar Eye is not in use for a long time, please remove the battery or cut off the power.

2. Product Installation

The installation process includes the installation of Solar Bee and Solar Eye. Please follow below steps.

2.1 Connecting Solar Bee and Straight Networking Cable

1) Please remove the square silica gel plug, and then insert network cable, as shown in Fig2-1

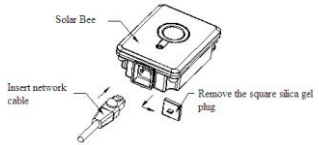

Fig 2-1 Insert network cable

Attention: Connection cable is standard CAT5 network cable with RJ45 connectors, CAT5, CAT5E is compatible.

2) Fix the accessories (waterproof seal sets) to Solar Bee, as shown in Fig 2-2

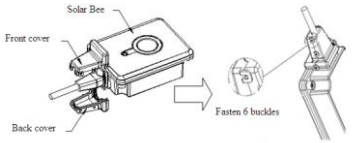

Fig 2-2 Installation of waterproof seal sets

2.2 Solar Bee Wall Attach Installation

1) Use the ST2.7*6 screws to fix two suspension loops onto the pillars of Solar Bee. Fig 2-3 as below

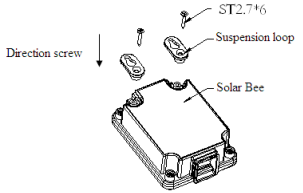

Fig 2-3 Suspension loop installation

2) Drill two ϕ 6 holes on the wall with 39mm space distance as Fig 2-4

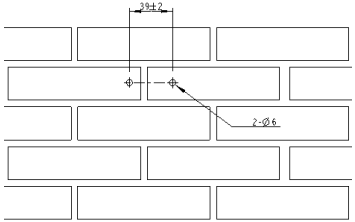

Fig 2-4 Drill the wall mounting holes

Attention: Hold the handgrip tightly; keep right direction, no shaking to prevent the damages to the wall and bias of the holes. The depth of holes must more than 30mm. Please keep the surface clean before measurement.

3) Use the rubber hammer to tap wall plugs into the holes.

4) Wring two ST3×25 screws into wall plugs, and keep the screw head 5mm space outside. Fig 2-5 as below

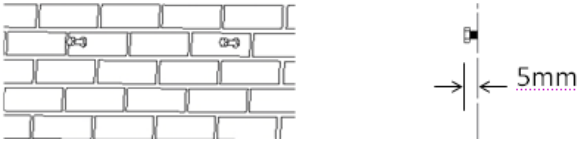

Fig 2-5 Fix screws

5) Hang the Solar Bee on the screws fixed to the wall. Tighten the screw with a screwdriver slightly. Fig 2-6 as below

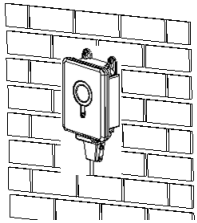

Fig2-6 Install Solar Bee

6) Connect Solar Bee and the PV inverter together with the straight networking cable. Fig 2-7 as below

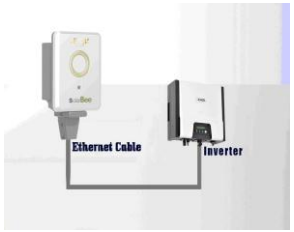

Fig 2-7Connect inverter and Solar Bee

2.3 SD Card (Optional) in Solar Eye and Battery Installation

Solar Eye adopts SD card (compatible up to 4GB). Users is able to upgrade Solar Eye Firmware through SD card.

1）Open the battery cover of Solar Eye. Fig 2-8 as below

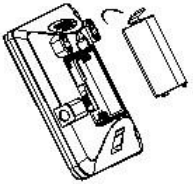

Fig 2-8 Open battery cover

2）Put SD card into the slot, then lock the MICRO SD card clamping plate. Fig 2-9 as below

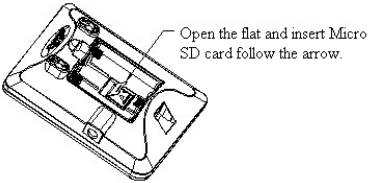

Fig 2-9 Insert SD card

3）Put three pieces AA alkaline battery into battery box following the + - marks as Fig 2-10.

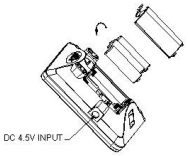

Fig2-10 Battery loading

Warning: Make sure the battery polarity. The product also could be powered by 4.5V DC adapter showing in the Fig 2-10.

2.4 Solar Eye Installation

There are two ways for Solar Eye installation: one is on the removable base, the other way is wall mounting.

2.4.1 Detachable Chassis Fixation

Press the Solar Eye bottom groove into the convex of base. With a sound of clattering, installation will be finished. Fig 2-11 as below:

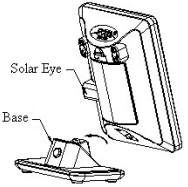

Fig 2-11 Solar Eye base setting

If want to remove Solar Eye from the base, press the base button and release connection. Fig 2-12 as below:

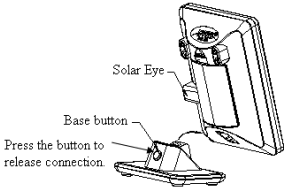

Fig2-12 Remove Solar Eye from base

Warning: When remove the base, there should be no force in case of mechanical damage.

2.4.2 Wall Mounting

1）Drill two φ6 holes with 43mm space distance. Fig 2-13 as below:

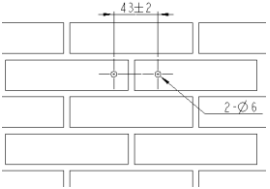

Fig 2-13 Drill the wall mounting holes

Warning: Stay vertical angle between driller and wall with no shake in case of incline. The hole should be no less than 30mm deep. When measure the hole depth, clear the dust inside.

2）Place the wall plugs into the holes with the rubber hammer.

3）Wring the screws ST3×25 into wall plugs, and keep the screw head 5mm

space outside. Fig 2-14 as below:

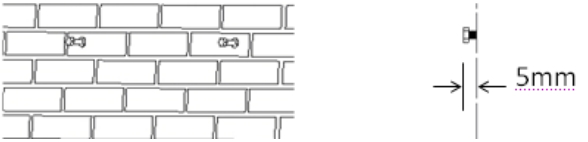

Fig 2-14 Fix screws

4）Hook the Solar Eye over the two screw nails. Fig 2-15 as below:

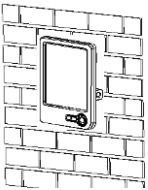

Fig 2-15 Hook Solar Eye on the wall

3. Interface Introduction

3.1 Main Interface

Solar Eye main interface as Fig 3-1:

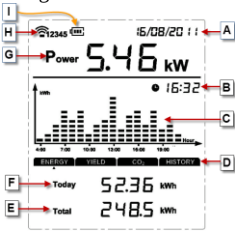

Fig 3-1 Solar Eye main interface

Pos. Fig 3-1	Description
A	Date
B	Time
C	Power trend
D	Sub menu
E	Gross generation
F	Intraday generation
G	Current generated power
H	Connected inverter quantity
I	Battery display(when battery power shortage happens, it will twinkle)

3.2 Sub Interface

Under main interface, press “enter” key to switch among ENERGY, YIELD, CO2 and HISTORY interfaces.

1）ENERGY interface：display E-today & E-total as Fig 3-2

Fig 3-2 ENERGY Interface

2）YIELD interface：display E-today yield & E-total yield as Fig 3-3

Fig 3-3 YIELD Interface

3）CO2 interface：display CO2 emission volume today and in total as Fig3-4

Fig 3-4 CO2 Interface

4）HISTORY interface：display hourly, daily, weekly, monthly and yearly generated electricity as Fig 3-5. For details, pls refer to chapter “4.6 check generated electricity”.

Fig 3-5 HISTORY Interface

4. Set & Operation

Three keys “left” (C), “right” (B), and “enter” (A) are available as Fig 4-1, which can help achieve all functions.

Fig 4-1 Key Guide

4.1 Initial Setting

Initial setup is required for first time use. Users are allowed to change these parameters as following:

4.1.1 Set Time

Hold “Enter” key for 3 seconds for setting as Fig 4-2. At this interface, press “left” & “right” key to change time, and switch to the next setting by “enter” key. All time & dates will flash to indicate the setting is finished; at this time, press “right” key to enter into currency setting interface.

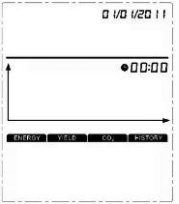

Fig 4-2 Set Time

4.1.2 Set Currency

Currency setting interface is as Fig 4-3. Press “left” & “right” key to switch among “€、£、$、¥” and then choose the target one by “enter” key. When it’s finished, press “right” key to enter into yield coefficient setting interface.

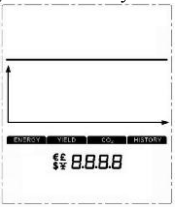

Fig 4-3 Set Currency

4.1.3 Set Yield Coefficient

Yield coefficient indicates the yield per 1Kwh electricity generated from PV inverter and its setting interface is as Fig 4-4. Press “left” & “right” key to change coefficient, and then confirm it by “enter” key. All digits flash to indicate the setting is finished. At this time, press “right” key enter into emission coefficient setting interface.

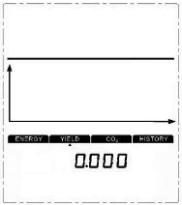

Fig 4-4 Set Yield Coefficient

4.1.4 Set Emission Coefficient

Emission Coefficient indicate the decreased CO2 volume (kg) per 1Kwh electricity generated from PV inverter and its setting interface is as Fig 4-5. “left” & “right” key to change coefficient, and then confirm it by “enter” key. All digits flash to indicate the setting is finished. At this time, press “right” key enter into main interface.

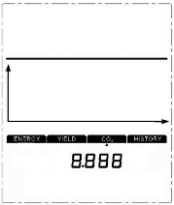

Fig 4-5 Set Emission Coefficient

4.2 Wireless Connection

Solar Eye can be connected to EverSolar inverter (up to 5 inverters) as the following two ways.

4.2.1 Connection Type

Type 1：One Solar Eye connects to multiple Solar Bee as Fig 4-6.

Fig 4-6 one Solar Eye connects to several Solar Bee

Type 2：One Solar Eye connects to one Solar Bee, and then the Solar Bee connects to several pieces of inverters as Fig 4-7.

Fig 4-7 one Solar Eye connects to one Solar Bee

4.2.2 Set Up Wireless Connection

1) Hold the Solar Bee under normal working state for 15 seconds, until LED of Solar Bee flashes, which indicates Solar Bee has been into connection state.

2) Hold “right” key of Solar Eye to go into connection state as Fig 4-8. At this time, the channel Solar Bee stays in will show on top left corner on Solar Eye, and press “left” & “right” key to choose channels Solar Bee stays in. For example, icon indicates Solar Bee stays in channel 1.

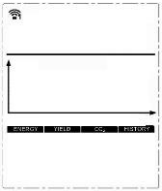

Fig 4-8 Wireless Connection Adjust

3) Press “Enter” button on the Solar Eye to connect, while symbol flashing, stop flashing after connection is ready, while LED is off. Solar Eye goes back to the main menu automatically after 1 minute.

4) Please repeat operation process above again if the connection failure,

One Solar Eye connects to several Solar Bee (up to 10); avoid to setting to same communication cannel.

4.3 Alarm Warning Setting

The alarm waning note user to deal with when inverter error happens, in the main menu, press and hold “left” and “right” buttons enter the interface of alarm warning setting, show as Fig 4-9. Press “left” and “right” to chose ON or OFF, then press “enter” button quit the interface to the main menu.

Fig 4-9 interface of alarm warning setting

Setting alarm “on”, solar-eye alarm warning every 5 minutes to note user when inverter error happens.

4.4 Data Storage Interval Time Setting

Data storage interval means the frequency of writing data to SD card. In the main menu, press and hold “left” button enter the interface of data storage interval. as show in “Fig 4-1”. User can choose the interval time from 1 to 5 minutes by pressing “left” or “right” buttons, Then press “enter” button go back to the main menu.

Fig 4-10 Interface of data storage interval

4.5 Restore Factory Default Settings

In the main menu, you press and hold both “left” and ”right” buttons, while switch on the power. LCD display in full screen, LED flash after 3 seconds, then device restore to default factory setting. After completion, device can be used again by switch on power.

Attention: history data will be lost if recover to factory default setting. therefore, copy the data in SD card before restore to factory default setting!

4.6 History Energy and Power Value Yield View

Call up HISTORY menu, you press “right” button to view history data by switching the unit of Y axis among “Hour”“Day”“Week”“Month” and “Year” by pressing “right” button. Operation process show as below:

1)**Hour**：Press “right” button, you can view the energy and power values/hour of last 34 hours yield by your PV system, Shown as in “Fig 3-1” “B” means the time you check, ”F” means energy and power values yield in this hour.

2)**Day**：Press “right” button, you can view the energy and power values/day of this day yield by your PV system, Shown as in “Fig 3-1” “A” means the data you check, ”F” means energy and power values yield in the day.

3)**Week**：Press “right” button, you can view the energy and power values/week of last 34 weeks yield by your PV system, Shown as in “Fig 3-1” “B” means the week you check, ”F” means energy and power values yield in this week.

4)**Month**：Press “right” button, you can view the energy and power values/month of last 34 months yield by your PV system. Shown as in “Fig 3-1” “A” means year you check, ”F” means energy and power values yield in this month.

5)**Year**：Press “right” button, you can view the energy and power values/year of last 4 years yield by your PV system. Shown as in “Fig 3-1” “A” means year you check, ”F” means energy and power values yield in this year.

5. Reference:

Table 5-1 Solar Eye specifications table

Item	Specifications
Power supply	
Wireless communication range	100m
Maxim MicroSD capacity support	4GByte
Operating temperature range	-10~50℃
Operating humidity range	≤80%
Wireless Operating frequency	433MHz
Solar Eye waterproof level	IP20

Table 5-2 Solar Bee specifications table

Item	Specifications
Power supply	
Wireless communication range	
Maxim RS485 length support	20M
Operating temperature range	-20~60℃
Operating humidity range	
Wireless Operating frequency	433MHz
Solar Eye waterproof level	IP65

6. Error Message

Table 6-1 Error Message

Error Code	Single phase error message	Three phases error message
1	GFCI Failure	GFCI Failure
2	AC HCT Failure	AC HCT Failure
3	Reference Voltage Fault	NA
4	DC inj. differs for M-S	DC inj. differs for M-S
5	Ground I differs for M-S	Ground I differs for M-S
6	Low DC Bus	Low DC Bus
7	High DC Bus	High DC Bus
8	Device Fault	Device Fault
9	NA	NA
10	No-Utility	Grid voltage =0
11	Ground I Fault	Ground I Fault
12	NA	Output Current High Protect
13	NA	Output Current High Protect By Hardware
14	Over Temperature in Inverter	Over Temperature in Inverter
15	Auto Test	NA
16	PV Over Voltage	PV Over Voltage
17	Fan Lock	Fan Lock
18	AC Voltage Out of Range	AC Voltage Out of Range
19	Isolation Fault	Isolation Fault
20	DC Injection High	DC Injection High
21	Fac, Vac Differs for M-S	Consistent Fault: Fac, Vac Differs for M-S
22	NA	Consistent Fault
23	Fac differs for M-S	Consistent Fault: Fac differs for M-S
24	Vac differs for M-S	Consistent Fault: Vac differs for M-S
25	NA	Output Relay Check Failure
26	AC Relay-Check Fails	AC Relay-Check Fail
27	NA	Output HCT Failure
28	NA	GFCI Device Failure
29	NA	M-S Version Unmatched
30	Fac Out of Range	Fac Failure: Fac Out of Range
31	EEPROM R/W Fail	EEPROM R/W Fail

32	Communication Fails between M-S	SPI Failure: Communication Fails between M-S
33	SPI Failure: Communication Fails between M-S	
34	EEPROM R/W Fail	
35	Relay check Fail	
36	DC Injection High	
37	The result of Auto Test unction is fail	
38	DC bus is too high	
39	The voltage reference inside is abnormal	
40	AC HCT Failure	
41	GFCI Device Failure	
42	Device fault	
43	M-S version unmatched	
44--54	reserve	
55	Fac Failure: Fac Out of Range	
56	AC Voltage Out of Range	
57	Utility Loss	
58	GFCI Failure	
59	PV Over Voltage	
60	Isolation Fault	
61	Fan Lock	
62	Over temperature in Inverter	
63	Consistent Fault: Vac differs for M-S	
64	Consistent Fault: Fac differs for M-S	
65	Consistent Fault: Ground I differs for M-S	
66	DC inj. differs for M-S	
67	Consistent Fault: Fac, Vac differs for M-S	
68	High DC bus	